REMARKS

Introduction

Receipt of the Office Action mailed August 14, 2009 is acknowledged. In the present response, claim 1 has been amended to be similar to granted claim 1 in the corresponding European Patent, EP 1 633900 B1, a copy of which is attached hereto. Claims 11 and 14 have been amended in regards to the Cu content. Claims 1 and 11 have been clarified to note that the percentages are by wt %. Claims 2 and 6 have been canceled without prejudice or disclaimer.

Claims 1, 3-5 and 7-20 remain pending. Support for the instant amendment is found throughout the specification and claims as originally filed, and indeed, the EPO determined the language was supported by the same specification.

Favorable reconsideration of the present application in view of the below remarks is earnestly solicited.

The Office Action

Claims 1 and 5-11 were rejected under 35 USC 112, second paragraph. It is respectfully submitted that this rejection is now overcome in view of the instant amendment to claims 1 and 11 to insert "wt %." Withdrawal of the rejection and favorable reconsideration are earnestly solicited.

Claims 1-20 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Evancho et al. (US 4,082,578). This rejection is respectfully traversed for at least the following reasons. The instant invention as recited in claim 1 is directed to a specific product, namely, an auto body roof, formed of an aluminium alloy sheet comprising Si: 0.7-1.3, Fe < 0.5, Cu: 0.8-1.1, Mn: 0.4-1.0, Mg: 0.6-1.2, Zn < 0.7, Cr < 0.25, Zr+Ti < 0.20, other elements < 0.05 each and < 0.15 total, remainder aluminium. And after solution treatment, quenching and age-hardening for three weeks at room temperature, the aluminum sheet has a yield strength $R_{0,2}$ of less than 170 MPa and has a high temperature yield strength, at the beginning of a paint baking heat treatment after a temperature rise, of at least 160 MPa..

Independent claim 11 and claims dependent thereon are directed to:

"11. An auto body part comprising at least one part made of steel and at least one skin part made of an aluminum alloy attached to the steel part before painting, the aluminum part comprises a sheet treated by solutionizing, quenching and age-hardening at room temperature, said sheet having the following composition: Si: 0.7-1.3, Fe < 0.5, Cu: 0.8-1.1, Mn: 0.4-1.0, Mg: 0.6-1.2, Zn < 0.7, Cr < 0.25, Zr+Ti < 0.20, other elements < 0.05 each and < 0.15 total, remainder aluminum, and wherein after solution treatment, quenching and age-hardening for three weeks at room temperature, said sheet has a yield strength $R_{0,2}$ of less than 170 MPa and has a high temperature yield strength, at the beginning of a paint baking heat treatment after a temperature rise, of at least 160 MPa..."

Independent claim 14 and claims dependent thereon relate to :

14. "Auto body skin part made of a sheet metal having a thickness of between 0.8 and 1.2 mm, said part having the following composition (% by weight): Si: 0.7-1.3, Fe < 0.5, Cu: 0.8-1.1, Mn: 0.4-1.0, Mg: 0.6-1.2, Zn < 0.7, Cr < 0.25, Zr+Ti < 0.20, other elements < 0.05 each and < 0.15 total, remainder aluminum, wherein, after solution treatment, quenching and age-hardening for three weeks at room temperature, said part has a yield strength R0.2 of less than about 160 MPa."

So while the three independent claims 1, 11 and 14 all describe separately patentable inventions of various scopes, it is respectfully submitted that Evancho fails to render obvious any of these three claims, much less the further aspects that are recited in dependent claims.

Note that the present invention solved an important and prevalent problem. This problem is mentioned in the description (see par. [0022] to [0024] of the published version) and as shown in Figure 5. Namely, there is a difference in the expansion that occurs between aluminum skin parts and steel frames during electrophoresis treatment, typically 195°C for 30 min., but also after long exposure to the sun, especially in hot weather conditions. By employing an aluminum part as claimed, this problem has been addressed.

In a configuration such as a body roof, there is typically a large flat sheet without any rib or other reinforcing structural design, and in only one part, attached on a steel frame. An auto roof does not include a reinforcement opened sheet structure (such as a hood inner sheet) as described example in Figure 2 in Evancho, and where the accommodation possibilities for the outer body skin are much more important. If a classical alloy is used for the aluminum part (such as described by Evancho) this inevitably leads to kinks and/or other defects as shown in the instant Figure 2/2 depicting longitudinal deformations caused by the thermal conditions of Example 5.

Evancho deals with alloys for auto body panels, but in all the examples, Evancho only teaches parts such as a hood, which always include a central rib and a stringer or stiffener (see fig.1) which notably reduces the risks of deformation. The behavior of such a sheet when compared to a body roof fixed on a steel frame is clearly different. Namely, in a first case where reinforcements are present, a certain accommodation of the whole structure (outer + inner) is possible when the temperature rises, without formation of kinks or other defects, especially if the aluminum sheet is provided with ribs or the like. In a second case, the steel frame, fully rigid, imposes its behavior and the flat skin sheet of the body roof in an aluminum alloy, fixed to the steel frame, can only undergo these stresses with eventual formation of kinks or the like, precisely the problem that the present invention solved. Furthermore, the requirements relative to the surface aspect are really more important cosmetically for a body roof than for a hood (which is essentially seen from above).

In Evancho, the teachings relate to a body skin part, without any indication of the size, is just cited as a less preferred configuration (see col.5, lines 48 to 53 : "on a less preferred basis"). Indeed, Evancho did not appear to have really tested these parts, whereas, in at same time the problem solved by the present invention is never even mentioned.

Many of the preferred alloys of Evancho would simply not work in the present invention. In particular, a 6111 alloy has a composition that is fully included in the range of the claim 1 of Evancho. The curves (dotted lines) of figure 2 clearly show that this alloy does not solve the

problem at all but, on the contrary, corresponds to a bad behavior. The same applies to the 6016 alloy of example 5 with a composition also really close to the ones of Evancho in claim 1.

As recited in claim 1, the instant invention includes a yield strength after solution treatment, quenching and age-hardening for three weeks at room temperature of less than 170 MPa[1], to allow for sufficient formability, and a high temperature yield strength, at the paint baking, (typically after the temperature rises between 150 and 200°C), that is greater than 160 MPa. This permits an avoidance of deformation of the body part.

It should also be noted that the first condition is not only linked to the chemical composition but also to the metallurgical structure and especially quenching. This may explain why in Example 10 of Evancho, according to table 6, after a probable water quench, the alloy has a yield strength of 17.6 ksi (121 MPa) after one day, but about 49 ksi (192 MPa) after 3 weeks[2], so clearly far beyond what is recited in claim 1.

Moreover, the present invention as recited in claim 1 includes a high temperature yield strength, at the beginning of a paint baking heat treatment after a temperature rise during said treatment, that is greater than 160 MPa. There is simply no teaching or suggestion of this feature by Evancho, and nothing can prove that this condition is fulfilled by the alloys of Evancho. To the contrary, the 6111 alloy in example 5 has a yield strength after three weeks of 179 MPa, so higher than recited in claim 1, and a high temperature yield strength of 159 Mpa, which is lower than recited in claim 1.

Finally the instant invention as recited in each of claims 1, 11 and 14 all include a Cu content from 0.8 to 1.1 wt %. Evancho, on the other hand, teaches a content of 0.1 to 0.6 and in particular, for alloy 10, only 0.47 %. Moreover, especially for application to external panels, Evancho requires in column 7, lines 22 to 26, a content between 0.25 and 0.50 %.

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[1] This does necessarily correspond to the time between the fabrication of said sheets and their shaping (by drawing) and assembling.

[2] Note that for all the examples, a slow cooling is applied after solution treatment.

In this regard, Evancho clearly teaches against using any amount higher than 0.5% since Evancho states in column 7, lines 38 to 43 that the maximum content of 0.5 % is particularly important because, in addition to the formability and strength, copper in excess can be detrimental to the weldability. As such, one of skill in the art would have thought Cu contents over 0.5 wouldn't work whereas it is just the opposite. Especially because steel frames potentially are made by laser welding.

Surprisingly and to the contrary of what is suggested by Evancho, (that a high copper content can be detrimental for formability), it was found by the present inventors and as mentioned for example, in paragraph [0025] of the published application, that sheets made of the alloy 6056, and according to the present invention, while harder in the T4 temper, have a formability equivalent to that of sheets made of alloy 6016.

To wit, below is set forth a chart wherein the instant invention and its components are described along with a side-by-side comparison with Evancho's generic disclosure as well as with specific preferred embodiments of Evancho. As can be seen from the below chart, there is simply no basis for a contention of *prima facie* obviousness under 103. And irrespective of whether a *prima facie* case exists, Applicants have provided evidence of unexpected results obtained by the presently claimed invention in view of what would have been expected by the closest prior art. The table also shows the overlap between the ranges of AA 6016 and 6111 and the ones of the alloys of Evancho.

This evidence of unexpected results are provided in the below table.

	Si	Fe	Cu	Mn	Mg	Zn	Cr	R0,2 low T	R0,2 hot before	R0,2 hot after	Others
Invention	0,7 - 1,3	< 0,5	0,8 - 1,1	0,4 - 1,0	0,6 - 1,2	< 0,7	< 0,25	< 170 pref 160	> 160	> 200 pref 220	Zr + Ti < 0,2
Pref	0,7 - 1,1		0,8 - 1,1	0,45 - 0,6	0,6 - 0,9	0,1 - 0,7		-			
Pref 2	0,7 - 1,0				-	0,15 - 0,30		-			
Example	0.85	0.07	1.00	0.45	0.75	0.16	0.02	146 ou 169	168	223	

Reference 6111	0.63	0.11	0.69	0.17	0.78	No	0.07	179	159	191	
AA 6111	0,6 - 1,1	< 0,4	0,5 - 0,9	0,1 - 0, 45	0,5 - 1,0	< 0,15	< 0,1				
AA 6016	0,9 - 1,5	< 0,5	< 0,25	< 0,20	0,2 - 0,6	< 0,20	< 0,1				
Evancho ex 10	1.13	0.18	0.47	0.43	0.78	No	No	28 ksi = 192			Ok
Evancho gen.	0,4 - 1,2	0,05 - 0,35	0,1 - 0,6	0,2 - 0,8	0, 4 - 1,1	**< 0,2 pref 0,05**		83 - 240			Ti : < 0,10
Evancho outer pref.	0,9 - 1,1	0,1 - 0,3	0,25 - 0,5	0,25 - 0,4	0,7 - 0,9	< 0,05	< 0,05	158 - 206			Ti : < 0,05
Evancho 6151 col 2	0.85	0.48	0.19		0.56	0.2	0.19	Trop dur			

Indeed, there is no basis for any contention that Evancho teaches or suggests the invention as instantly claimed. Indeed the EPO has already granted similar claims as demonstrated in the attached EP counterpart B1 document. Applicants also wish to point out the separate patentability of many of the dependent claims. For all these reasons, this rejection is believed to be improper and should be withdrawn.

Conclusion

In view of the evidence and remarks submitted above, Applicants respectfully urge that this application is in condition for allowance and request favorable action thereon. The Examiner is invited to contact the undersigned if any additional information is required.

Applicants authorize the Commissioner to charge Deposit Account No. 50-4254, referencing Attorney Docket No. 2901683-000026 for fees due or any deficiencies of fees and to credit any overpayments.

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Respectfully submitted,

By /Susan E. Shaw McBee/
Susan E. Shaw McBee
Registration No.: 39,294
BAKER DONELSON BEARMAN CALDWELL & BERKOWITZ, PC
Attorneys for Applicant

Customer No. 84331

555 11th Street, NW
6th Floor
Washington, DC 20004
Customer No. 59554
(202) 508-3479
(202) 220-2213 (Fax)